



Research Report 25

Value Chain Analyses for a Climate Resilient Production of Cotton and Sugarcane Commodities in Ethiopia

By

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Addis Ababa, Ethiopia

July 2015

This research report is part of the research project on ‘Strategy options for a climate resilient production of cotton and sugarcane in Ethiopia’. The project is financed by the SCIP Fund, which is financed by the governments of the United Kingdom (UK), Norway and Denmark.

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Report citation:

Berihu Assefa, Mezgebe Mihretu and Alebel B. weldesilassie. Value Chain Analyses for a Climate Resilient Production of Cotton and Sugarcane Commodities in Ethiopia. 2015. EDRI Research Report 25. Addis Ababa: Ethiopian Development Research Institute.

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1. Introduction

Climate change poses threat to all economic actors though the degree of impact may vary from actor to actor or from activity to activity. Understanding the structure (i.e., roles, economic linkages and governance system) of the various economic players who are vertically integrated in input supply, production, distribution or consumption of a certain agricultural value chain is essential in the formulation of an adaptation strategy for building climate resilience in the agricultural sector. Good understanding of the roles, linkages and governance system among the different economic agents in the value chain of agricultural commodities helps not only to come up with an adaptation strategy but it is also essential to minimize the anticipated impacts of climate change on all the stakeholders and the most vulnerable societies. In this regard, the approach that has proved useful and consistent in understanding the roles, linkages and interactions among interdependent economic agents in a certain value chain is the value chain analysis (VCA).

This research employs the value chain analysis method to analyze the economic relationships and governance system that exist among key actors in the value chain and use this information to develop adaptation options to climate change. Our analysis will especially focus on key agricultural commodities; namely cotton and sugarcane, which are also considered major industrial inputs for textile and sugar industries respectively. Sugar and textile are strategic export commodities in the industrial development of Ethiopia (MoFED, 2010). Moreover, land surplus countries like Ethiopia have a clear comparative advantage in cotton and sugarcane production. The value chain approach helps us to examine the roles of and linkages among the actors, the length and complexity of the value chain and the economic shares of each actor in the value chain. From such analysis, we would be able to extract information from each actor's degree of involvement in the value chain and the likelihood of vulnerability to climate change. We then link this knowledge to workable and specific adaptation strategies to build a climate resilient economy. The analysis is based on household survey and focus group discussions with key informant and stakeholders.

The paper is organized in five sections including the introduction. Section II provides the country context, highlighting the importance of agriculture and its vulnerability to CC. Section III provides a brief overview of the methodology and main assumptions used for the value chain analysis. Sections IV highlights the conceptual framework of value chain analysis followed by the main analytical results for cotton and sugarcane value chains, respectively. Section V concludes with key findings and their policy implications.

2. Country context

Agriculture is the largest employer, main source of livelihood and foreign exchange in Ethiopia (contributing 43% to GDP, 50% to export and 80 % to employment). It is quite important for early industrialization as it supplies cheap food, raw materials and initial capital. Sustainable

supply of cheap food to industrial workers and urban areas boosts industrial cost competitiveness by keeping wages low. In this context, the impact of climate change on agriculture is an issue of great significance to the lives and livelihoods of millions of poor people who depend on agriculture for survival. Although agriculture by its very nature (is low-capital and nature-dependent) is more climate-change sensitive than other sectors, not all agricultural commodities and social groups are equally vulnerable. Climate change poses a particular threat to certain commodities and social groups, especially to those that have low institutional capacity with unclear roles, weak linkages and social structures.

Ethiopia's vision is to become a middle income economy by 2025 by achieving an average annual economic growth of 10% through building a modern and productive agricultural sector, strengthening the industrial base and growing exports (MoFED, 2010). However, evidences show that the country is most vulnerable to climate change impacts. The current climate variability is already being felt in the form of hazards such as flood, drought and soil erosion; and these impacts will be exacerbated by CC. This is likely to pose risk to achieve the country's vision if not well addressed. In response, the country envisages to achieve its vision through economic growth that is resilient to CC in line with the global shift towards low carbon society that results in no increase in emissions. Towards this, it has launched the green economy (GE) strategy in 2011 (EPA, 211). However, unlike low carbon development (as in GE strategy), which can be a response to global burden; resilience is a response to a local, regional and national level impacts. Thus, any benefits from resilience are sector, location and risk specific, and the objectives for resilience are wider than the single goal of CO₂ reduction as in the GE strategy. This shows that there are no universally agreed standards to appraise options for building resilience. This in turn creates challenges in identifying adaptation options for the agricultural sector as a whole from a particular agricultural commodity or livelihood strategy. However, it is possible to develop adaptation options for resilience from analysis made at individual commodity levels. This research tries to contribute to such efforts by focusing on cotton and sugarcane using the value chain approach, which enables us to analyze all the participants in a value chain and the dynamics of the relationships among them. The value chain analysis is helpful in such exercise by identifying the most vulnerable activities and actors along the value chain and providing the necessary information to develop adaptation strategy to build the resilience of the commodities to CC impacts.

3. Conceptual Framework

The term value chain denotes to both a set of interdependent economic activities and a group of vertically linked economic agents required to bring a product or service from its conception to sale in its final markets (Kaplinsky, 200; Bellù, 2013). It comprises all the direct and indirect participant actors and their activities in the value chain. These sequences of tangible and intangible value-adding bundle of activities form holistic view of network and linkages, involve direct and indirect hierarchal and non-hierarchal decisions (globalvaluechains.org, 2011). Porter (1985) and describe two major categories of business activities: primary activities and support activities. Primary activities are directly involved in transforming inputs into outputs and in delivery and after-sales support. These are generally line activities of the organization. They include: material handling and warehousing, operations, order processing and distribution,

marketing and sales. On the other hand, support activities include support primary activities and other support activities that include: technology development, technological inputs needed in every value chain activity; procurement, human resource management, firm infrastructure, planning, finance, accounting, legal, government-affairs and quality management. The actors and activities are in turn supported by a range of technical, business and financial service providers. A simplified agricultural value chain can be represented by the following diagram.

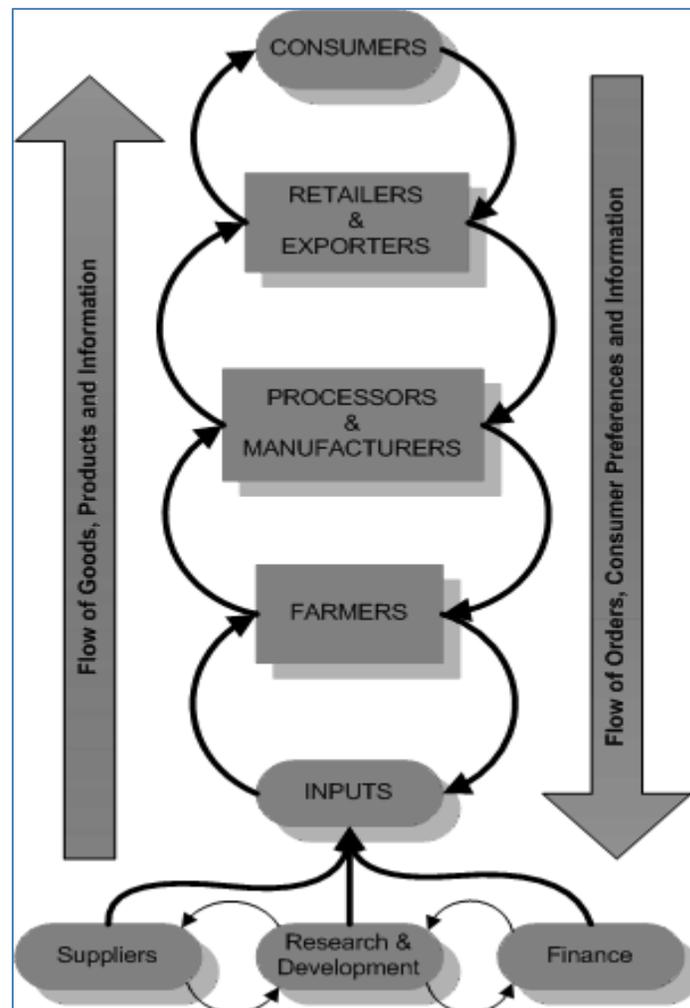


Figure 1: Typical Agricultural Value Chain

Source: Adapted from ACDI/VOCA World Report Fall 2006: The Value Chain Approach; Strengthening Value Chains to promote Economic Opportunities

A typical agricultural value chain (as depicted in figure 1) includes direct actors that are commercially involved in the chain (i.e., producers, processors, traders, retailers, consumers) and indirect actors that provide services or support for the functioning of the value chain. These include financial or non-financial service providers such as bankers and credit agencies, business service providers, government, researchers and extension agents. The general framework presented in Figure 1 could vary a little bit when drawn for specific agricultural commodities. It depends on how much information we want to capture; but the general framework for value chain actors and support system is as depicted in figure 1. The chains can be simple when producers directly sell to the consumers but it can also be long and complex when many other actors play roles in buying, processing, transporting and selling to the end user, the consumer.

The systematic study of value chain actors and their governance system such as economic relationships and organization of transactions among economic actors along the value chain dates back to Coase (1937) and Williamson (1971), who are considered to be the fathers of the New Institutional Economics (NIE). And later the value chain concept was popularized in a book published in 1985 by Michael Porter, who used it to illustrate how companies could achieve what he called “competitive advantage” by adding value within their organization. Ever since then the value chain analysis approach has been extensively used to identify the sources of inefficiency and market failure by investigating the relationships and linkages of agents in the value chain (e.g., see Lazzarini et al. 2001). Value chain actors are assumed to be economic rationales because they behave in such a way that they choose a governance system that minimizes transaction costs under conditions of bounded rationality and opportunistic behaviors of economic partners (e.g., see Rindfleisch and Heide 1997; Williamson 1999). They choose governance structures that maximize their benefit. One such system is usually the contractual system, which is considered the main form of safeguarding against risk of opportunism by value chain actors. However, this does not mean that there are no inefficiencies and market failures in agricultural value chains. Especially agricultural value chains in developing countries are characterized by uncertain business environments with opportunistic behavior of actors and weak institutional enforcement (see e.g., Ruben et al., 2007). But even then the NIE proves to be quite useful to determine the best agreements or contracts in uncertain environments.

According to Kaplinsky and Morris (2001), the valuechain analysis generally addresses the following issues:

- a) Value chain mapping: a value-chain analysis systematically maps the actors participating in the production, distribution, processing, marketing and consumption of a particular product (or products). This includes assessing the characteristics of actors, their profit and cost structures, and flows of goods throughout the chain.
- b) Identifying the distribution of benefits of actors in the chain: by analyzing margins and profits within the chain, one can determine benefits of each participating actor in the chain. This is particularly important in the context of developing countries like Ethiopia (and in agriculture in particular), given concerns that the poor in particular are vulnerable to CC impacts.
- c) Value chain upgrading: upgrading can involve improvements in quality, delivery time and flexibility, innovativeness, etc that enable actors to gain higher value.

- d) Value chain governance: governance in a value chain refers to the structure of relationships and coordination mechanisms that exist between actors in the value chain.

Building on Kaplinsky and Morris (2001) and Ruben et al. (2007), we adopted an approach that views value chains as key instruments to investigate the structure, the governance system and the degree of involvement of actors. In this context, we aim to address the following issues:

- Identify the main actors and understand their economic roles in the cotton and sugarcane value chains.
- Understanding the economic relationships and governance system that exist between the participating actors and how they currently operate in the value chain.
- Highlight current barriers to efficiency and competitiveness and identify areas of potential improvement of the value chain.
- Determine the length of the chain, information flow and share of each actor in the value chain.
- Drive information that is useful to come up with tailored and specific adaptation options to climate change for the two commodities.

As stated above, we address the above issues by focusing on cotton and sugarcane agricultural commodities based on the current production and marketing status of the commodities and future development plan of the country regarding the two commodities.

4. The Value Chain of Cotton and Sugarcane Commodities: A climate change perspective

4.1. The Economic Significance of Cotton and Sugar Cane in Ethiopia

4.1.1. Cotton

Given its excellent growing conditions, abundance of raw materials and availability of land, Ethiopia has a great potential for cotton production. Cotton chiefly grows in low-to-mid-altitude areas (i.e., sea level to about 1000m). According to the Ministry of Agriculture, Ethiopia possesses 3 million hectares of land suitable for growing cotton - an area that equals the cotton land in Pakistan, the world's 4th largest producer (see table 1). Ethiopia's major potential cotton growing areas include Omo-Ghibe, WabiShebele, Awash, Baro-Akobo, Blue Nile, and Tekeze river basins. There are three major groups of cotton producers, i.e., the small holder farms, large state farms and private commercial farms – accounting for approximately 27, 31 and 42% of total area cultivated and production respectively (see table 1).

However, although Ethiopia has a great potential in cotton production, it only uses 111,886 hectares, which is 3 percent of the total land available for cotton and produces about 80,000 metric tons annually. While cotton produced by the state farms and private commercial farms is mainly used in the modern textile manufacturing sector and to some extent exported to foreign countries, cotton produced by peasant farms is for the large part used by the hand loom sector.

The Economic Value of Cotton in the Ethiopian economy is significant. Firstly, it is a major industrial input for textile firms. The textile and garment industry is one of the priority areas in Ethiopia's industrial policy. Currently, Ethiopia has about 14 textile factories and 50 medium-to-large garment manufacturers. There is a relatively better FDI flow in the textile and garment sector; especially many Turkish textile firms are relocating to Ethiopia. Hence, the demand for raw cotton and fabric continues to expand as existing textile firms expand and new domestic and FDI firms join the sector.

Table 1: Land Availability, land Holding by Farmers and Production

Regions and land available for cotton cultivation				Number of cotton farmers			
Region	Woredas (number)	Land suitable (ha, million)	% of total	Farmers	Average number	Landholding range (ha)	
						Minimum	Maximum
High potential cotton producing areas	38	1.9	63.3	Small holders	52,754	0.25	0.75
Low potential cotton producing areas	79	1.1	36.7	Mechanized rain-fed	408	10	3,500
				Mechanized irrigated	107	10	15,323
total	117	3	100	Total	53,269		

Source: Kassaye Mekuria based on estimates of the Ministry of Agriculture (2012)

Secondly, cotton is a major export crop. According to data obtained from the Ethiopian Revenue and Customs Authority (ERCA), Ethiopia earned 10.6 million USD in 2009/2010 and 0.5 million USD in 2010/2011 from cotton export. The export declined because Ethiopia banned exports of cotton in 2010 to protect domestic textile firms from high international cotton prices. The ban was lifted in 2012 but export did not pick up as cotton growers have been discouraged by price disincentives such as the ban in 2010. . Furthermore, in order to export, cotton exporters must first get permission from three separate government agencies (MOA, MOT, and NBE) (e.g., see GAIN, 2012). This burdensome procedure might have discouraged exporters. Another possible explanation is that cotton producers might have shifted to other cash crops such as sesame because of the price disincentive created as a result of policy intervention.

Thirdly, the textile and garment sectors are relatively labor-intensive. For example, the cotton sector employs about 52, 754 smallholder farmers. Similarly, huge employment opportunities are also generated from both private commercial and state farms that are engaged in cotton production.

4.1.2. Sugarcane

In Ethiopia, sugarcane is used for the production of sugar. Ethiopia has suitable agro ecology zones for the production of sugarcane which is the primary input in the production of sugar. The production of sugar started in Ethiopia in 1951 with a joint venture between a Dutch company and the Ethiopian government to establish Wonji sugar factory. Ethiopia is most suitable for water-intensive sugar production and Ethiopian sugarcane yields are among the highest in the world (Berkum, Roza, and Tongeren, 2005). The sugar sector is important not only for the linkage that it would create between agriculture and industry and the suitable environment for the sector, but also because it is a source of renewable energy and will play a role in the country's climate resilient green economy strategy.

Sugarcane is also produced for direct consumption by smallholder farmers. According to the Central Statistical Agency (CSA), sugarcane produced by smallholders is a small fraction of total sugarcane production. Over 6.7 thousand metric tons of sugarcane is produced in the year 2011/12, of which only 15% is produced by smallholders (see figure 2).

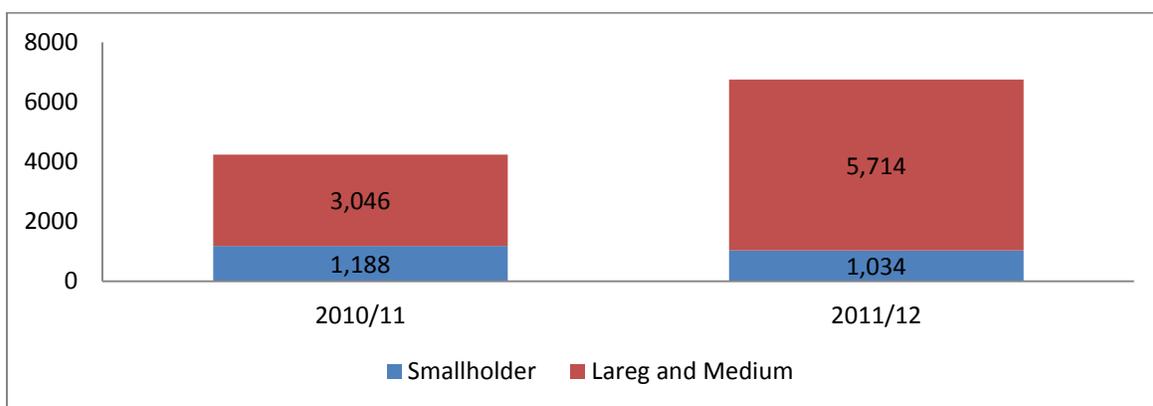


Figure 2: Total Sugarcane production in Ethiopia in '000 Metric Ton

Source: CSA Survey Report

Sugar production in Ethiopia is dominated by large factories supplied by large farms as in many other African countries. Currently, there are three sugar factories in the country. The factories use sugarcane produced by state farms and out-growers from the areas surrounding the factories. Sugarcane used for production of sugar comes from either state farms or out growers around Wonji sugar factory. The out grower schemes can be described as integrated schemes where inputs (including technology) are provided and farmers supply their labor.

On the other hand, although the production of sugar has been on average 279 thousand Metric tons per annum between 2003/04 to 2012/13 and has not shown significant change over the years, import has been growing signifying growth in consumption. In fact import has more than doubled in 2008. The increase in import can be attributed to increased demand for sugar domestically because of increased per capita consumption. The opening of the EU sugar market which has granted Ethiopia a preferential access to the EU sugar market where sugar had been sold above world price has led to an increase in export. In 2009, export of sugar has stopped as shown in the data (see figure 3).

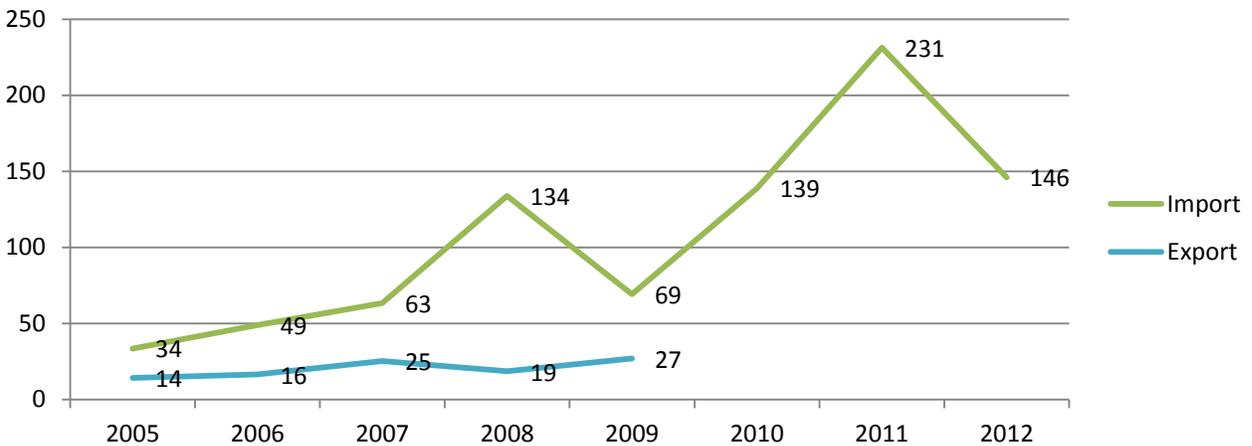


Figure 3: Sugar Export and Import in '000 Metric Ton for the period 2005 - 2012

Source: ERCA (Ethiopian Revenue and Customs Authority)

Sugar production also has other objectives. One of the objectives of the plan to expand the sugar sector is to create employment opportunities and according to the information obtained from Sugar Corporation, the number of people employed in the industry in 2012/13 is over 20,000. In addition, the sugar industry produces Ethanol as a by-product. Since 2009, Ethiopia has started blending ethanol with benzene. Ethanol is produced in Fincha and more recently Metahara sugar factories. Finally, the sector is expected to contribute to electricity generation.

4.2. Cotton Value Chain Complexity and Actors' Distribution

4.2.1. The Cotton Value Chain Length

The cotton value chain varies from simple to complex. It can be very simple or short; for example, when producers sell directly to textile and garment firms and textile and garment firms directly sell to consumers, or it can be a bit complex or relatively long when a lot of actors (including input suppliers, producers, local assemblers, wholesalers, ginners, traders, processors and consumers and other support providers) are involved. If we attempt to sketch the entire activities within the cotton value chain, then it gets more complex. For simplicity, figure 4 sketches only the primary value chain actors - those individuals who take ownership of a product, through the exchange of money or equivalent goods or services, during the transaction process of moving the product from conception to the end user. Secondary activities, i.e., those individuals or firms providing a service without taking ownership of the product are illustrated in figure 5. In the case of cotton value chain, the primary actors include input suppliers, farmers, traders, brokers, processors, retailers, and consumers; the secondary

actors include financial or non-financial service providers such as bankers and credit agencies, business service providers, government, researchers and extension agents (see figures 4 and 5). Each of these actors adds value in the process of changing product title.

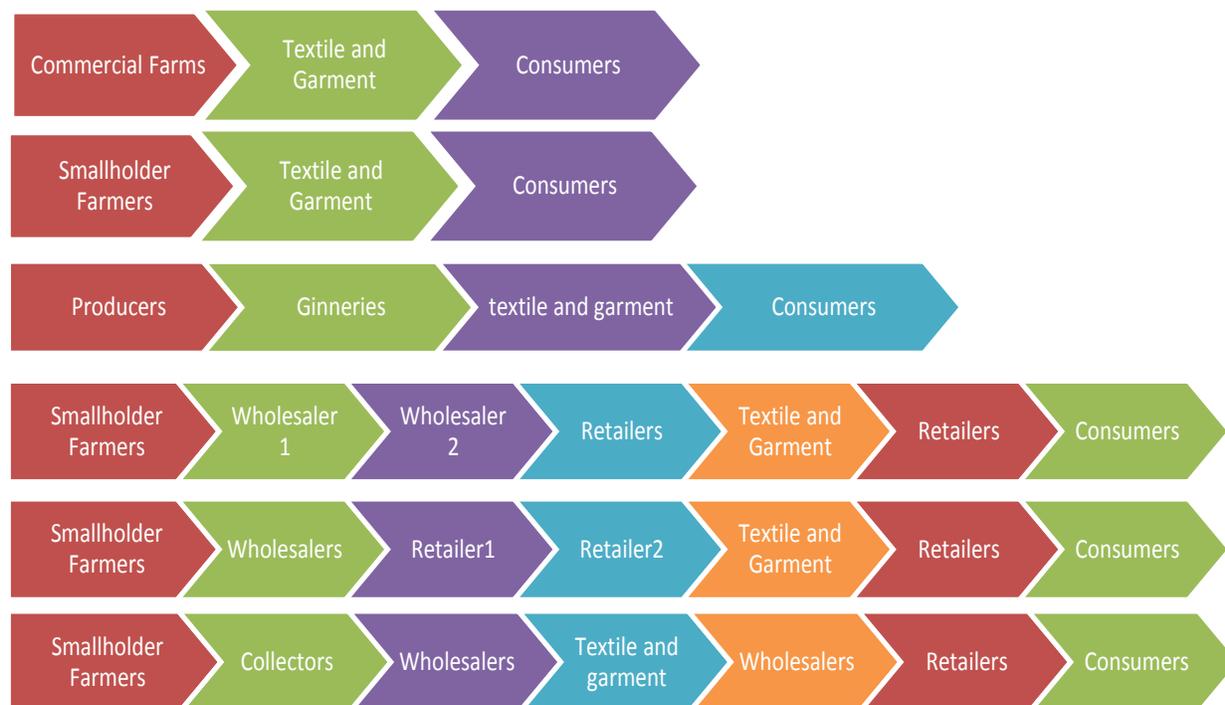


Figure 4: Market Structure of the Cotton Value Chain: Length and Complexity

Source: Compiled from field surveys

And the functions performed by the main chain actors are depicted in table 2.

Table 2: Summary of cotton Value chain actors and functions

Cotton Value Chain Activities	Activities Undertaken by
Input supply	<ul style="list-style-type: none"> • Cooperatives, farmers, PAs • MoRAD, BoRAD • Research institutions, Private firms,
Production	<ul style="list-style-type: none"> • Smallholder farmers, commercial farms, Cooperatives
Processing	<ul style="list-style-type: none"> • Ginners, weavers and spinning, handloom, textile and garments
Trading	<ul style="list-style-type: none"> • Assemblers (collectors), wholesalers, retailers
Consumption	<ul style="list-style-type: none"> • Urban and rural dwellers

Source: Compiled from field surveys

For cotton, figure 5 provides a more complete picture as it brings both the primary and supportive actors and activities together, where the value direct actors which are commercially involved in the chain (producers, traders, retailers, consumers) and indirect actors which provide services or support the functioning of value chain are presented side by side.

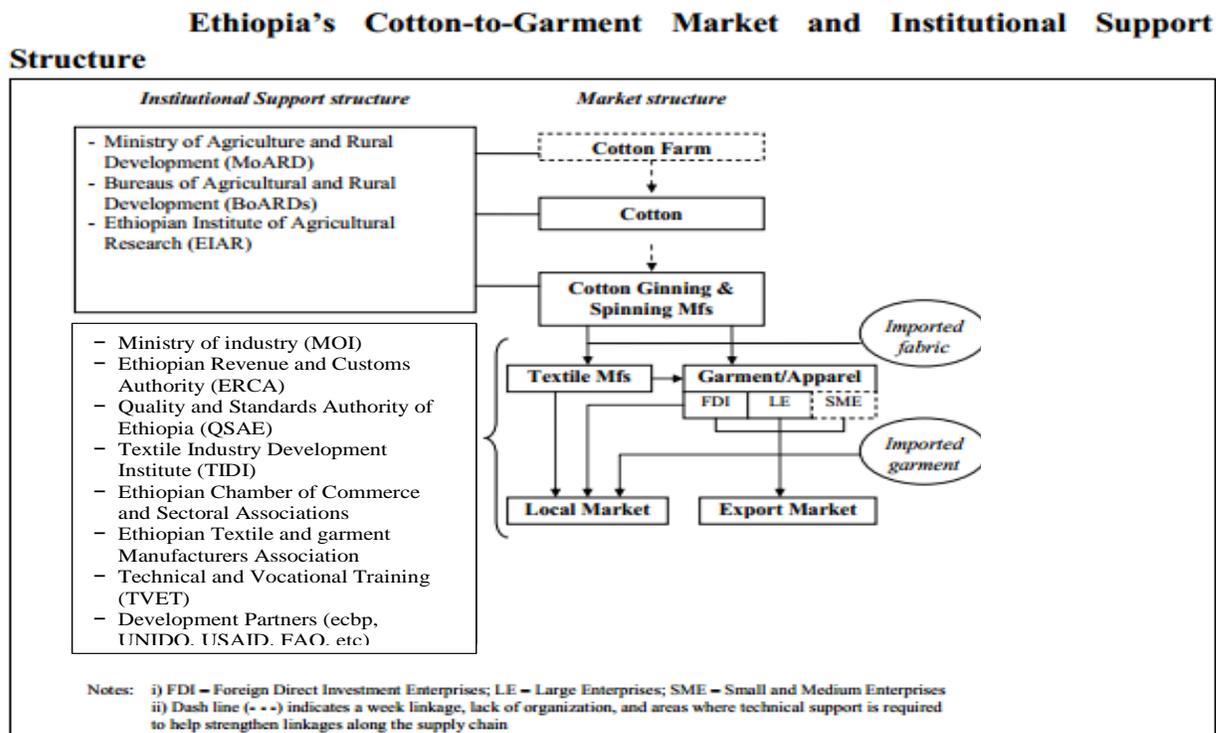


Figure 5: Cotton Value Chain and Institutional Support structure: Schematic

Source: Global Development Solutions, LLC

4.2.2. The Distribution of Value Addition by Actors in Cotton

Value added is created at different stages and by different actors throughout the value chain. Value added may be related to improving quality, delivery times or delivery flexibility or cutting cost or encouraging innovativeness, etc. The size of value added is decided by the end-consumers' willingness to pay. Value added can be defined in terms of the percentage of value each actor adds or in terms of the profit margin each actor drives from its economic activities, for example by improving quality or delivery time or cutting cost, etc. While value addition may be calculated as the difference between sales per unit and material cost per unit, profit is calculated as the difference between value added and labour cost.

Table 3: Estimated Value Addition Distribution Among Cotton Value Chain Actors

Value chain	Producers	Wholesalers	Retailers	Textile and Garment	Consumers
Sales price (Birr/kg)	15	32	42	xx	
Cost of raw material	1.5	2.25	2.85	na	
Gross value added	13.5	29.8	39.2	na	
% of total value added*	16.4	36	47.5	na	

*Total value added = 82.45; na = not available

As can be seen from table 3, there is more value addition as we move from primary sectors (such as farming) to manufacturing. Farmers add only about 16 percent of the total value addition while cotton retailers add about 48 percent. It is difficult to see that most of the value additions will be by manufacturers and manufacturing retailers. Smallholder cotton producers sell their cotton produce at approximately Birr 15 (2014 average price) by adding a value of 14 per kg which is about 16% of the total value added. On the other hand, wholesalers and retailers add 36% and 48% of the total value added. The price differential between what consumers pay and what farmers receive is about 180%. This also shows that farm gate prices are extremely lower than end-product prices. The implication of this analysis for climate resilience is that those actors that add more value are likely to stand CC shocks but those that are adding little value such as farming (or farmers) are likely to be greatly impacted by CC.

4.3. Sugarcane Value Chain Complexity and Actors' Distribution

4.3.1. The Sugar Cane Value Chain Length

The sugarcane value chain is relatively short consisting of mainly outgrowers, factories, sugar corporation, wholesalers and retailers and consumers (see figure 6). Institutional support is provided by various financial institutions, government agencies and research institutes. Final consumers of sugar include households and industries.



Figure 6: Market Structure of the Sugarcane Value Chain: Length and Complexity

Source: compiled from interviews and field visits

The sugar corporation collects sugar from all operational sugar factories and distributes to selected wholesalers such as the Ethiopian Grain Trade Enterprise, ET Fruit and consumer associations. Buying from these wholesalers, retail traders retail sugar to consumers who consist of households and industries. Unlike cotton, sugarcane producers directly supply to sugar factories through a long-term contractual system.

4.3.2. The Distribution of Value Addition Among Sugarcane Value Chain Actors

Farmers (sugarcane out growers) reported an average price of 3 birr per kg and their farming activities add the least value (about 5% of the total value added). On the other hand, sugarcane wholesalers and retailers add the most value (about 27 to 28 percent of the total value added) followed by sugar factories which add about 15 percent. The farm gate price (price sugarcane farmers or out growers receive) is lower by 80 percent compared to sugar consumer price.

Table 4: Estimated Value Addition Distribution Among Sugarcane Value Chain Actors

Value chain	Producers (Outgrowers)	Sugar Factories	Sugar Corporation	wholesalers (Gin-Ad, ET Fruit, etc)	Retailers	Consumers
Sales price (Birr/kg)	3	8	12.65	14	15	
Cost of raw material	0.8	1.32	1.5	2.1	2.65	
Gross value added	2.2	6.68	11.15	11.9	12.35	
% of total value added*	5	15.1	25.2	26.9	27.9	

5. Analysis of the Governance system in the Cotton and Sugarcane Value Chain

5.1. Conceptual Frame Work of Value Chain Governance

Value chain describes the full range of value adding activities required to bring a product or service through the different phases of production, including procurement of raw materials and other inputs (e.g., see World Bank, 2010; UNIDO, 2011,). The process may include multifaceted activities such as design, inputs, production, marketing, logistics and distribution and support to the final consumer. These sequences of tangible and intangible value-adding bundle of activities form holistic view of networks and linkages, which involve direct and indirect hierarchal and non-hierarchal decisions. Porter (1985) describes two major categories of business activities: primary activities and support activities. Primary activities are directly involved in transforming inputs into outputs and in delivery and after-sales support. These are generally line activities of the value chain these include: material handling and warehousing, operations, order processing and distribution, marketing and sales (communication, pricing and channel management; and service installation, repair and parts). On the other hand, support activities include activities that support primary activities – e.g., technology development, technological inputs needed in every value chain activity; procurement, human resource management, firm infrastructure, planning, finance, accounting, legal issues, government, affairs and quality management. What Porter called “competitive advantage” stems from many discrete activities that add value in designing, producing, marketing, delivering and so on.

There are four dimensions of a value chain: an input-output structure, which describes the process of transforming raw materials into products; a geographical consideration, in today's world different activities are usually carried out in different parts of the world (local, national, regional and global); governance structure, which explains how the value chain is controlled; and an institutional context in which the industry value chain is embedded (Gereffi, 1995 & 1999 and Humphrey & Schmidt, 2002). While liberalization across economies and sectors has cemented the ways for value chains to flourish (Purwaningrum, et al. 2009), globalization produces diverse social processes, including the spread of certain means of production patterns of consumption from specific geographic, political and national contexts to others though small firms in developing countries might have less capacity to be able to move upwards within the value chain (Synder, 1999 and Kaplinsky and Morris, 2002). Next, we focus on the value chain governance of participating actors and how it affects decisions on productions, procurements and marketing.

Value chain governance as explained in earlier sections refers to the dynamic distribution of power and control over resources among actors along a value chain. Gereffi (1994) relates governance to the authority and power relationships on the allocation of resources, control exercise, influence of others on the value chain, and setting the modes and rules of interaction along the value chain. According to World Bank (2009), governance system describes the interaction between the actors along the value chain. Actors across all value chains establish relations with each other through contracts, vertical integration, alliance and/ or jurisdictionally, and through power influence. These relations can address multitudinous formal and informal arrangements for activities across the value chain: processing, distribution and logistics. While a single governance for an entire value chain can be defined, there are varying degrees of relationship at different steps of the value chain.

According to World Bank (2007), the stronger the linkage and the influence of one over the other, the higher the benefit from improved inputs, ICT, market and capital. Hence, the competitive advantage within the value chain can be attained by the tradeoff between the economic incentives and the cost of losing independence. For example, chains established vertically and supported jurisdictionally and with power influence, decisions and communications on production, logistics and marketing are made through hierarchies. Chains established through contracts alliances may emerge due to common interest between the parties. The extent of influence however mainly depends on the tradeoff benefits and costs and on the strength of enforcement of the legal and regulatory frameworks. Hence, by way of summary, the form of governance or type of relationship among firms along the value chain can influence the value chain competitiveness, opportunities and or otherwise. Conversely, the governance pattern can be varying as time evolves and industry actors get mature. Our discussion on governance system focuses on cotton and sugarcane value chains in Ethiopia.

Gereffi (1994,p.97) defined governance as “authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain”. Governance analysis helps to understand how a chain can be controlled and coordinated when certain actors in the chain have more power than others. In other words, value chain governance is the dynamic distribution of power and control among actors along a value chain. Power refers to the

relationship among actors, the degree that one firm or group of firms dominate the value chain. In the commodity value chains framework, governance was described broadly in terms of “buyer-driven” or “producer-driven” chains. The difference between producer-driven and buyer-driven commodity chains is primarily in terms of their governance structures. Buyer-driven highlights the powerful role of successfully branded large retailers and wholesalers in dictating the way chains are operated by requiring suppliers to meet certain standards and protocols, despite limited or no production capabilities. According to Ponte and Gibbon (2005), value chains are becoming increasingly “buyer-driven” despite are known to be characterized by ‘hands-off’ forms of co-ordination between ‘lead-firms’ and their immediate suppliers. This is because, the former have been able to embed complex quality information into widely accepted standards and codification and certification procedures. In contrast, producer driven chains are vertically integrated along all segments of the supply chain and leverage the technological or scale advantage integrated suppliers (Gerefi, 1994). In line with this, research on the horticulture industry (Dolan and Humphrey, 2000) and the footwear industry (Schmitz and Knorrington, 2000) reinforced Gereffi’s notion that global buyers (retailers, marketers, and traders) can and do exert a high degree of control over spatially dispersed value chains with little production, transport or processing facilities ownership. Governance system describes the interaction between the actors along the value chain. Actors across all value chains establish relations with each other through contracts, vertical integration, alliance and or jurisdictionally, and power influence. These relations can address multitudinous formal and informal arrangements for activities and across the value chain: processing, distribution and logistics (World Bank, 2009). The study has described three dimensions of governance:

- **Chain organization:** describes the way the actors (primary stakeholders) are aligned in the value chain (either horizontally or vertically). It indicates how information and services flow along the value chain and the degree of strength of their inner linkages.
- **Institutions:** Such as agencies, research institutions and associations that serve as links between actors in the chain and participants and outsiders. These stakeholders are neither completely internal nor external to the chain. The effectiveness of these institutions can affect the performance and wellbeing of the value chain in a business environment.
- **Legislation and regulation:** may affect the way the actors operate in the value chain. These encompass legal and regulatory frameworks as well as public and non-public interventions relevant to the development of the value chains.

The governance structures are determined by three variables: the complexity of transactions (information) between actors in the chain; the ability to codify transactions (arranging principles, rules and laws into an organized system) and the level of supplier competence (Frederick and Gereffi, 2009, and Gereffi et al., 2005). According to the same study, trade liberalization and globalization and vertical disintegration followed by innovation and product development and marketing strategies laid the groundwork for a variety of network forms of governance situated between arm’s length markets, on the one hand, and large vertically integrated corporations, on the other. Theoretical framework of the value chain identifies five types of global governance: markets, modular, relational, captive, and hierarchy.

Markets: Markets governance involves transactions that are relatively simple. Information on product specifications is easily transmitted, and suppliers can make products with minimal input from buyers. These arm's length exchanges require little or no formal cooperation between actors. Hence, the cost of switching to new partners is low for both parties (producers and buyers). The central governance mechanism is price rather than a powerful lead firm.

Modular value chains: Modular governance occurs when complex transactions are relatively easy to codify. Typically, suppliers in modular chains make products to a customer's specifications, which may be more or less detail. Suppliers provide turn-key services and take full responsibility for competencies surrounding process technology, use generic machinery that enable to limit transaction-specific investments and also at the same time spread investments across a wide customer base. This keeps switching costs low and limits transaction-specific investments, even though buyer-supplier interactions can be very complex. Linkages (or relationships) are more substantial than in simple markets because of the high volume of information flowing across the inter-firm link. Information technology and standards for exchanging information are both key to the functioning of modular governance.

Relational value chains: Relational governance occurs when buyers and sellers rely on complex information that is not easily transmitted or learned. This results in frequent interactions and knowledge sharing between the parties. Such linkages require trust and generate mutual reliance that are regulated through reputation, social and spatial proximity, family and ethnic ties, and the like. Despite mutual dependence, lead firms still specify what is needed, and thus have the ability to exert some level of control over suppliers. Producers in relational chains are more likely to supply differentiated products based on quality, geographic origin or other unique characteristics. Relational linkages take time to build, so the costs and difficulties required to switch to a new partner tend to be high. Many authors including Menkhoff (1992) highlight the role of spatial proximity in supporting relational value chain linkages, but trust and reputation might well function in spatial dispersed networks where relationships are built-up over time or are based on dispersed family and social groups.

Captive value chains: In these chains, small suppliers are transactionally dependent much larger on one or a few buyers that often wield a great deal of power. Such networks feature a high degree of monitoring and control by the lead firm. The power asymmetry in captive networks forces suppliers to link to their buyer under conditions set by, and often specific to, that particular buyer. In general, in this type of governance, suppliers are dedicated to the buyer's needs. Hence, the system leads to thick ties and high switching costs for both parties. Since the core competence of the lead firms tends to be in areas outside of production, helping their suppliers upgrade their production capabilities does not encroach on this core competency, but benefits the lead firm by increasing the efficiency of its supply chain. Ethical leadership is important to ensure suppliers receive fair treatment and an equitable share of the market price. It is referred also as 'directed relationship'. The theoretical pattern of governance is pictorially presented on figure 7 below in a way that shows the degree of influence between the parties in the value chain.

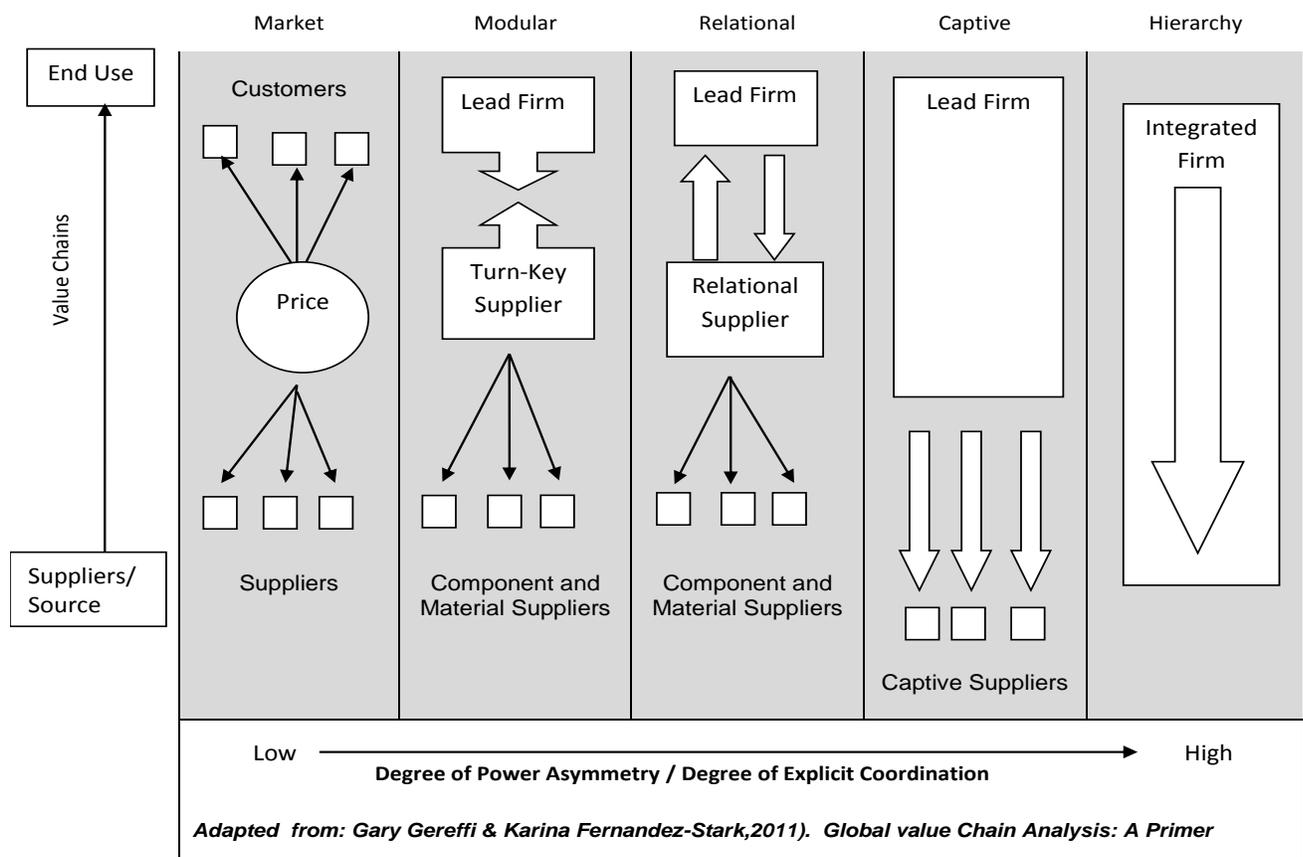


Figure 7: Schematic presentation of the value chain governance forms

5.2. Governance system in the cotton value Chain

5.2.1. The Role of Key Actors in the Cotton Value Chain

As explained earlier, value chain is the range of systematically interrelated and interconnected activities in a dynamic fashion from the point of input supply to the process of production and marketing involving a number of actors that may include designers, brand owners, retailers, regulators, policy and research institutions, energy and labor markets etc. Likewise, the value chain of the cotton commodity in Ethiopia is pictorially illustrated below (see figure 8).

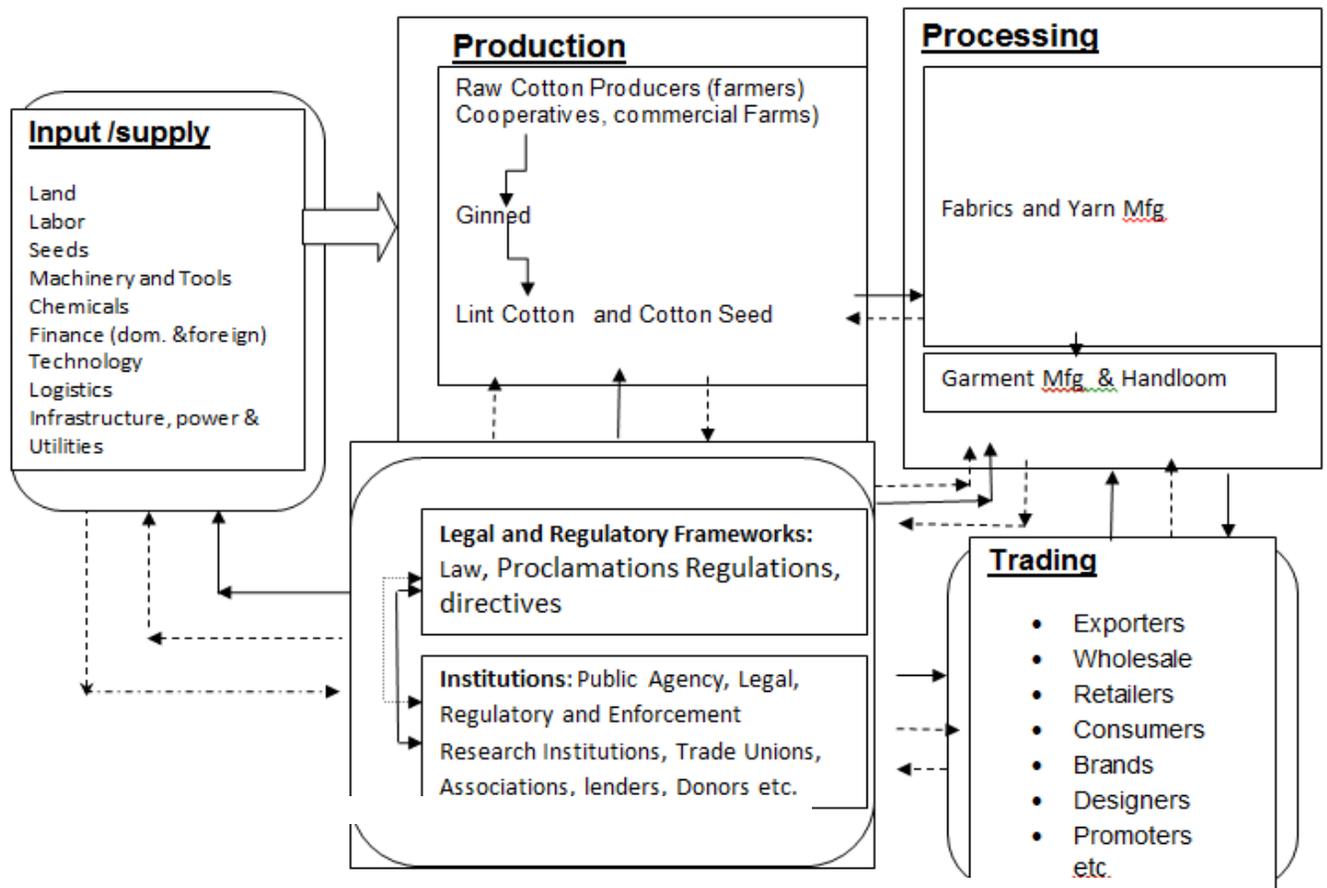


Figure 8: Key Stakeholders of the Cotton Value Chain

Cotton is the largest non-food agricultural product required universally by all members of a society whether in developed or developing countries whether by the rich or the poor in one or another form. Cotton is produced by both the economy leading countries and the developing countries. Cotton employees more than seven percent of the developing countries labor force (Banuri, 1998). USA is by far the leading largest producer followed by China, India and Pakistan. Ethiopia has enormous potential for production of cotton given the excellent growing conditions (i.e., abundance of raw materials and availability of land). However, only about 111,886 hectares is in use (which is 3 percent of the total land available for cotton) and produces about 80,000 metric tons annually. Ethiopian textile industry uses most of lint cotton input from cross border suppliers. Thus, poor performance of the cotton industry affects the economy negatively in terms of income generation, export hard-currency earnings, immense employment opportunities both at the rural and urban dwellers and technological transformation towards both backward and forward linkages with various sectors.

The cotton commodity chain covers a sequence of chain of activities from seedbed preparation including fertilizer and herbicide application, planting along with application of fungicides, herbicides, pesticides and fertilizer, weed and insect control including defoliation if harvesting is by manual or mechanical means, transportation, ginning, spinning weaving, processing, and garment manufacturing. Spinning, weaving, and processing include a number of detailed activities. The activities of the chain can be summarized into major ones, namely, cotton

production, ginning, transportation, textile manufacturing, garment industry, trading, and oil industry processing. Along the value chain, some are dominant and the others are non-dominant actors. The paper considers the key actors across the value chain. Generically, the paper has broken the value for cotton into four main segments for key stakeholders' analysis purpose: Inputs to cotton, cotton production, textile manufacturing and cotton seed processing. In each section the main processes and primary actors in each segment of the value chain are discussed. Market share of the cotton production sales are described in terms of market share. Besides, some support actors of the cotton value chain that have a prominent role have been discussed.

i) Key Actors of Inputs to Cotton

The key inputs to cotton production include: seeds, agricultural chemicals (including pesticides, herbicides, fungicides, and fertilizers), machinery and utilities used in planting, harvesting and labor force at each level of activities.

Seed Companies: Seeds are supplied mainly by commercial cotton farms, ginning companies and private traders. The availability of seeds is limited in Ethiopia. In Ethiopia commercial seeds are supplied by commercial farms such as, Hiwot Agricultural Mechanization, Lucy Agricultural Development Plc and Amibara Agricultural Development Plc. whereas rarely parent seeds are supplied by the Research Center (Melkawere National Cotton Seed). There are no professional seed suppliers in Ethiopia like the case in USA. In USA there are both small and big global companies that are professionals in producing inputs including cotton seeds and chemicals. For example, Delta Pine and Land (DP&L) provides cotton seeds. In Ethiopia, cotton farms suffer from lack of availability of the parent seeds. There are no firms whose business is specialized in cotton seed supplying. In addition, there are no research institutions that can experience a variety of seeds varying with geographic features such as soil and weather conditions. It is only when there is excess stock with the commercial farms that can supply to the small farm holders and cooperatives. The sector also suffers from supply of machineries both in terms of availability of rental service of machineries and price due to economies of scale especially those with small farm holder producers and small plot size land owners. In line with the cottonseed, land availability is a key for the cotton industry.

Agricultural Chemical Suppliers: Agricultural Chemicals include, pesticide, herbicide, fungicide, and fertilizers. The major actors in the supply chain are multinational global companies such as DuPont, Cargill, BASF, Bayer etc. In Ethiopia, cotton farms get chemical inputs from Adamitulu pesticide processing SC. and private import trading agents including chemical suppliers (enterprises and cooperatives, retailers). In the case of USA, the cotton industries Dupont Cargill and Cytec are key companies engaged in supplying fertilizers to the cotton industry (Houston, et al., 2005).

Agricultural Machinery & Tools Suppliers: Cotton farms use agricultural machinery tools for farm development, planting, pesticide and herbicide spray, and harvesting. Besides, Amibara General Aviation Service provides the service of chemical spray service to different commercial cotton farms.

Manpower: Cotton farms are the major employers during harvesting for non-skilled contractual labor forces. Commercial farms employ highlander labor forces, mainly men, instead of

women due to the working conditions, though the latter are more productive than the former. Besides, individual household uses self and relative workforces. Recently micro and small enterprises started facilitating the availability of work forces to the industry when there are requests from commercial farms. Cotton producers face challenges of supply of contractual temporary laborers, wages, sheltering, and food items supply. Though cotton producers prefer women workforces for cotton picking efficiency, it cannot be feasible to deploy women in the area due to sheltering safety reasons.

Regional Administrations: Administrative organs avail land for cotton farms especially to private investors. In some parts of the country, until very recently, landlords of the vicinity do have more power and influence over the land availability.

Agricultural extension services: Government institutions give some technical and extension supports both to the private farms and individual household farmers. The extension services may include: organizing farmers for discussion on direction and target defining and awareness creation, on-job (site) training of farmers, land development and input usage, pest control mechanism and many other agricultural activities. Agricultural officers help farmers sharing knowledge of experience and monitoring performances on a regular basis. As cotton is part of the agricultural husbandry, farmers can get such services free of charge from a Ministry. It was also learned that the agricultural government agencies involvement in terms of technical support is very limited as opposed to the other agricultural farming activities. If any technical support has been provided by the public agricultural and environmental agencies, it is limited mainly to smallholder farmers and cooperatives. The commercial farms do get little technical support from any of the public agencies. Following the reinstatement of the sector under the supervision of the Ministry of Industry (Mol), the extension services that have been provided by the Bureau of Agriculture or Ministry of Agriculture and Rural (MoAR) to the smallholder farmers and cooperatives is minimized as leaned from the group discussions with the associations. Besides, use of transgenic varieties of cottonseed and streamlining weed control and limiting exposure to various kinds of pests helps the cotton industry to enjoy higher yields and lowering possible risks. However, due to some policy and regulatory issues and financial capacities of the companies and research institutions, switching from traditional to bioengineered seeds and chemicals is either illegal or expensive in introducing cottonseed varieties. The concern from the regulatory is that new and biotech seeds may encourage developing even more devastating insects and weeds.

Financing institutions: Financial institutions include commercial banks, insurance companies and micro finance institution. Commercial banks and micro finance institutions provide financial inputs to the commercial farms and individual household farmers respectively. Some commercial farms suffer from shortage of working capital due to the reticence of the commercial banks to finance rain fed farms. Until recently, commercial farmers were only financing irrigation fed commercial farms. Recently, however, commercial banks have started revising their policies on the financing of commercial agriculture farms.

Transport and Logistics: Both traditional means of transportation like donkeys and mules and modern ones are used to transport raw cotton to storage. Trucks are used to transport raw cotton to ginning and the ginned products to textile factories and warehouses. During export,

trucks and other logistics institutions and institutions like marine, customs and financial institutions are involved.

Infrastructure, Power and Utility suppliers: Infrastructure including roads, telecommunication power supply and health centers are the basic inputs for the productivity of cotton production and further processing.

ii) Cotton Production

The production of cotton lint consists of four major activities before shipment to textile mills: cotton growing or production, harvesting, ginning of raw cotton, and warehousing. Cotton farmers manage the former two stages, namely, activities up to production and harvesting. Ginning, the process of seed removal, is done by ginning firms or commercial farms those that own ginning plants. There are three cotton producers in the cotton industry in Ethiopia: smallholder farmers, cooperatives and commercial farms (private owned and public enterprises). The nature and the role of the key stakeholders in the cotton production are briefly described below.

Cotton Cooperatives: Cooperatives are associations of farmers governed by a decree issued by the FDRE proclamation No. 147/1998, and amendment Proclamation 402/2004. Cooperatives are legal entities that run along the same lines as share companies which provide members with economies of scale for services that on individual own would be prohibitive. The services provided by cooperatives may include marketing, logistics services (includes: warehousing, transport, and shipping facilities), financial managements, trainings, public technical service support coordination, product standardization and specification services, and contact administrations with third parties. Cooperatives sell cotton lint to local markets or textile factories and foreign markets. They also sell cottonseed to cottonseed processing firms. Cooperatives are powerful in terms of negotiating with third parties in relation to marketing and contract management and in influencing policies and institutions. Cooperatives' presence in the Ethiopian cotton market is so strong that it can shift to other agricultural practices when the cotton market is unattractive.

Individual household Farmers: Individual householders are farmers who produce cotton in their plots in small quantities. The individual farmers sell their raw cotton in a market to individuals or cotton merchants (cotton collectors) who in turn sell to commercial farms at prices offered by the latter. Individual household farmers are little powerful to influence markets and policy institutions.

Cotton Merchants: Cotton merchants are raw cotton collectors from individual household cotton growers. These merchants are usually informal traders who in turn sell the raw cotton to commercial farms at marginal prices. They are informal traders that can shift the business any time suddenly.

iii) Textile and Garment Manufacturing

Textile manufacturers receive cotton lint to produce yarn and threads and then fabrics. Globally textile manufacturing produces products based on prior orders from wholesale and retail companies. The types and standards of fabric products nowadays are determined by branded wholesalers following the vulnerability of the industry for unprofitability and bankruptcy in the 1990s. The textile industry has reacted by adopting technological innovations, by way of establishing strategic alliances between cotton cooperatives with textile firms, on the one hand, and between the textile companies and the retailers they supply on the other (Houston, et al., 2005). Hence, the key players in the textile manufacturing are designers and brand owners. Garment manufacturing companies follow the interest of the brands and designers. The FDRE government gives much emphasis to earnings from export of textile and garment instead of exporting raw cotton demonstrated by the ban issued in October 2010. The ban was lifted in April 2012 conditionally, where the raw cotton producer can only export with a prior approval by the regulatory. The main markets for textile and garments are the United States, Europe, Canada, and domestic markets. The American Growth Opportunities Act (AGOA) allows Ethiopian garments to enter the U.S. market duty free (Nathan associates, 2013). The garment industry is fashion demanding, constantly changing about five fashion seasons a year.

iv) Logistics and power Service

The garment industry, imports are ordered based on contracts and committed delivery dates. Before the order is placed, the manufacturers must obtain foreign currency, which entail a wait of 30 to 90 days, according to Nathan Associates Inc (2013). Export is processed through the Djibouti port where the service of staffing and unstaffing and packaging takes place which take time and are costly. The current textile and garment companies are being challenged by power interruptions, delay in logistics services and electronic-commerce, robust internet and telecommunication systems (Nathan Associates Inc, 2103).

v) Wholesalers, Retailers, Consumers, Designers and Promotion Companies

Literatures explore that textile industries driven by large retailers and textile companies have had to adapt to the ever changing scenario by responding to the pressure for greater quality control and speed of delivery demanded by retailers such as Wal-Mart (Houston, et al., 2005). In doing so, manufacturers receive exclusive contracts and access to valuable information regarding consumer preferences from the companies they supply ahead of planning. Similarly, the Ethiopian textile manufacturing produces products in line with the orders from garments and internationally branded buyers such as H&M as learned from the manufacturers. Besides, designers and promoters are significantly decisive actors along the value chain in fostering value addition. Moreover, information communications down the supply chain marketing channels are sources of value addition along the value chain.

vi) Cottonseed Processing

Cottonseed processing involves three steps: delinting, hulling, and oil extraction. Cottonseed processing delivers three main products namely: oil, dairy feed (hulls) and linters. Cottonseed processing has become an extremely useful segment in the cotton industry following the high

demand for the edible oil extracted from cottonseed and rest byproducts used for animal feeds, fertilizer, and linters which are used for chemical and non-chemical industries. The driving forces for the cotton processing segment include the public, dairy farms and industries.

vii) Supervisory and Support Agencies (indirect actors in the industry)

There are a number of industry-wide institutional actors and legal and regulatory factors that contribute politically, in governance, advocacy and marketing related activities without which the successfulness of the industry may not be possible.

- Ministry of Agriculture and Rural Development (MoARD): is responsible for developing policies and strategies and supervising the performance and development of the sector. Agricultural bureaus and the ministry give valuable services including extension services by way of deploying agricultural extension workers.
- Ministry of Industry (Mol): develops policies and strategies for the industrialization of the country in general and textile industry in particular.
- Textile Industry Development Institute (TIDI): supervises the performance of both the cotton production and textile manufacturing industries. TIDI is accountable for MOI.
- Ministry of Environment Protection Agency (EPA): responsible for the protecting the environment.
- Cooperatives and Unions: are significantly important for the close and active engagement of individual household farmers in the cotton production process.
- Research Institutions: introducing and dissemination of productive, environment friendly and pest resistance seeds. Research institutions are crucial in the cotton value chain process. The role of research institutions in the process of breeding, succession of improved varieties, testing agro-chemicals, developing tolerance varieties to drought vulnerabilities
- Standard Agency (Regulation No.193/2010): rationalization, selecting and fixing in terms of aspects, sizes, and methods etc.
- Ethiopian National Accreditation Office (Established by regulatory 279/2010): test and accreditation certification for the quality of products
- Ethiopian-Conformity Assessment Enterprise (Established by Regulation No. 196(2010): provides certificate with respect to the country's export, products, by assessing their conformity to the relevant national and international standards or standards of other countries
- Health and safety institutions:
- Associations (Ethiopian Cotton Producers, Ginning and Export Association) & Textile Association. **ECPGEA** and Textile Associations are established in line with the Chamber of commerce and Sectorial Association Proclamation No. 341/2003 article no.23 to 28. Such associations are established by the members of the producers in seeking support by way of training members, promoting products and creating market links on the one hand and advocacy works on the other for better policy and working environments. The associations generally focus on marketing, information linkage with their respective members, trainings to some extent and advocacy works. The associations' secretariat office reports to the Board of Directors and to the General Assembly.

viii) Public and Regulatory Frameworks

Policies, Legal and regulatory frameworks shape the role of the actors in the value chain. Among others, the policies, strategies, legal and regulatory frameworks relevant to the value chain include: GTP, Agriculture led Industrialization, Land management and certification, Proclamations to provide for the establishment of cooperative societies, Ethiopian Climate, Ethiopian Labor Law, AGOA.

5.2.2. Mode of Governance System in the Cotton Value Chain

This section discusses the governance system in the cotton value chain. Value chain governance as explained in earlier sections refer to the dynamic distribution of power and control over resources among firms along a value chain. Gereffi (1994) relates governance to the authority and power relationships on the allocation of resources, control exercise, influence of others on the value chain, and set the modes and rules of interaction along the value chain. According to World Bank (2009), governance system describes the interaction between the actors along the value chain. Actors across all value chains establish relations with each other through contracts, vertical integration, alliance and or jurisdictionally, and power influence. These relations can address multitudinous formal and informal arrangements for activities and across the value chain: processing, distribution and logistics. While a single governance for an entire value chain can be defined, there are varying degrees of relationship at different steps of the value chain.

There are various actors along the entire value chain consisting of input suppliers, producers, textile factories, and brand companies etc. Literatures underpin that governance system in a value chain may not be unimodal. The governance system in a value chain may differ from one segment to another. Table 5 below describes the possible types of governance modes of the main segments of the value chain and the possible implications thereof.

Table 5: Governance System in Selected Segments along the Ethiopian Cotton Value Chain and Implications

Value chain Segment Actors	Stakeholders involved	Relationship/Governance	Implications on the overall value chain
I. Organizational			
1.1 Input Suppliers	Land providers and Cotton producers	The mode of governance is (hybrid) most relational, established through long term contractual and relational mode of governance. In Afar region, though there is long term contract, it seems very complex to define the pattern	The pattern of relationship for inventors in the Afar regional state is more of suppliers influence. Makes the climate change resilience implementation complex. Requires, long term envisaged mitigation strategy.
	Machinery and Equipment rental	Markets,	characterized by 'arms-length, Much looser form of co-ordination, low barriers to entry, very low switching cost
	Seeds, Chemicals, logistics etc.	Markets	Looser influence between the suppliers and buyers
	Infrastructure, power and utilities	Relationship is through alliance	Government is interested in expanding investment. But, still there is limitation to fulfill the demand of investors
	Logistics	Markets,	Little or no formal cooperation cost of switching low.
1.2 Cotton Producers	Management members, employees, Gender	Hybrid mode of governance: contract (market) hierarchical, and jurisdictionally (public enterprise and commercial farms)	Complex: requires innovation, introducing modern system of management, performance measurement. Besides, the cotton industry favors men than women Strategy for awareness creation on climate change and the possible reaction on resilience aligned to the mode of relationship.
	Ginners	The relationship with cotton producers is markets mode of governance. However, a few of the ginners are vertically integrated, hierarchy type of governance	Little or no coordination, takes decision on their perspectives independently, cost of switching low. When the cotton producers left their farming, ginners face difficulties of market.

1.3 Manufacturing	Textile, garments, weavers	In Ethiopia unlike the world, the mode of governance between cotton producers and manufacturing seems markets, until disrupted by the institutional directives	Little or no coordination between cotton producers and manufacturing. Each takes decision by their own. Cotton producers specially private developers and cooperatives switched off Degree of influence loose, textiles loose supply and unemployment increases, capital flight increases High risk to mitigate CC
1.4 Trading	Exporters, wholesale, retailers, consumers, brands, designers, promoters	Contractual with the textile, garment, Captive mode of governance	Often wield a great deal of power influence on the industry; designers, fashioners influence the industry. Contractual relationship very strong. The nature of the industry is buyer-driven, by large retailers rather than producers and processors. Cost of switching very high. Therefore, while considering policies and strategies, the industry must take into account the trading segment of the industry and it is equally true for the CCRS.
2. Institutions	Chambers, ECPGEA, ETMGA, EIAR	These actors are aligned horizontally along the cotton value chain usually relational type of governance.	These institutions link the different segments of value chain by way of arrangements that enable independent actors to involve and have collective decisions in a legitimate and acceptable manner. The regulator institute issued a directive that restraint cotton producers from export of their products, which later has been amended. Help stakeholders get acquainted with market knowledge, management capacity etc. Very instrumental for technology and innovations and CC resilience strategy adaptation.
3. Legislation and Regulatory enforcements	Mol, Textile Agency, court systems	Affect the way the actors operate in the value chain. Sets standards, and checking compliance. It is a hierarchic mode of governance.	Sometimes directives are issued from the regulatory that may disrupt the whole value chain

The governance system of a given commodity value chain is influenced not only by the various actors of inter-firm and intra-firm in the different segments of the value chain but also by the global power influences specially commodities with span of international borders. The cotton commodity is a good exemplary in this case. Taking part of the cotton value chain, the segment for cotton production there are household farmers, cooperatives and commercial farms. In Ethiopia unlike other African countries the share of the household and cooperative farms combined constitute 30% of the cotton production whereas, commercial farms constitute 70% of it.

Farmers' cooperatives do have legal personality as per the Proclamation 147/1998, and amendment Proclamation 402/2004. Farmers' cooperative formed by individuals voluntary who have similar needs for creating savings and mutual assistance among themselves by pooling their resources, knowledge and property. Cooperative governance is structured under four layers: Cooperative members, Primary Cooperative Society, Cooperative Union, Cooperative Federation, and Confederation. Cooperatives are accountable to the general assembly. Cooperatives and unions shall have a management committee for a term of office of three years, accountable to the general assembly. Members of the committee are elected by the general assembly with a limited service of years. Each committee member can serve not more than two consecutive terms. Besides, every cooperative or union shall have control committee, with the terms of office not more than three years. Similarly, each of the members of the control committee shall not be elected for more than two consecutive terms.

On the other hand, private commercial farms (companies) are established under the commercial law issued in 1960. Private companies report to the shareholders of the respective companies, whereas public commercial farms operate under the Public Enterprises Proclamation No.25/1992.

A few of the cotton commercial farms in Ethiopia own vertically integrated ginning processing plants. The ginning firms and the ginning plants owned by commercial firms give ginning services to the cooperatives and commercial firms. Households that are not part of a cooperative usually sell their products to cotton merchants or to individual buyers where the latter use it for traditional cloth making or weaving. Small holder farmers interact along the value chain with markets which are typically of spot markets. The ginning service beneficiary cooperatives and commercial firms receive back their products in terms of cotton lint and cottonseed. In some instances, they may use the service of warehouse of the ginning firms until their products are sold either to textile factories or export markets. Cooperatives and commercial farms had been dealing with both local and international markets freely directly or through their association ECPGEA for a number of years. However, following the directive issued by the MoI, cotton producers have been supplying to the textile firms at the price prevailing in the international market. The ban was lifted a year and half later in April 2012 following the complaints from the producers and high international cotton prices and government anticipation of increased demand from the local textile and garment industry (Nathan Associates Inc. 2013). The producers however were not pleased with the system in general due to the delay in collecting their money from the textiles. As a result, many have withdrawn from cotton and joined sesame agriculture indicating disruption in the chain. Subsequently, it was followed by shortage of cotton supply from the domestic market. The textile factories are currently obliged to import cotton from abroad exposing the country for

capital flights. This clearly implies that cotton industry value chain is facing challenges to operate in harmony and collaboration especially between the key actors namely, cotton producers and the textile and garment industry. As a result, the situation has tripped the whole value chain of the cotton industry despite the enormous potential for cotton production that could enjoy huge earnings for the country.

With regard to the form of governance (relationship), there is not a single structure for the entire value chain that can be described or attached. It varies from segment to segment along the value chain. For example, the governance relationship between household farmers and cotton merchants and the relationship between cotton input suppliers and cotton producers seem markets type. Textile and factory firms had used the support of the regulatory to access the cotton from the producing firms. In turn however, they were not in a position to settle their debtors' balance on time. As a result, the relationship between cotton companies and textile manufacturing has been neither market nor any of the five governance modes. A group discussion with the cotton producers and the regulatory revealed that the industry is experiencing long with no track of record regarding performances, system of collaboration among actors along the value chain. In addition, problems of labor supply and contract enforcement were raised among others.

Until recently, there was little hierarchal form of governance structure in the value chain of the cotton industry. Now, it is learned that some textile firms are on the move towards upstream (backward) vertical integration along the value chain aiming for a stable raw cotton supply. Similarly, a few of the textile manufacturing firms are investing downstream (forward) vertical integration to produce garment. These show that textile manufacturing companies are upgrading themselves within the value chain forming hierarchal type governance. Integrating vertically within the value not only provides the opportunity to add more value on the product but also fosters capability to enable closer relationship with both buyers and suppliers. The effect of this would be twofold: first, vertical integration positions a firm placing standards and more demands on suppliers and second, enables the firm to perform on more value added activities and generates more revenues (Stamm, 2004). It is to be remarked however, vertical integration or hierarchic governance increases degree of power asymmetry and degree of explicit coordination as well (Gereffi, 1994). Therefore, in general, the tighter the linkage, the stronger the cohesion of interaction and collaborations among the actors within the value chain and the stronger the power of influence on the value chain, the higher the opportunities and competitiveness in the industry. However, vertical integration on the other hand trades off not only innovations, creativity and efficiency but also minimizes the property and resource ownership empowerment of farmers and cooperatives in the cotton industry.

To summarize, the governance system of the cotton industry value chain in Ethiopia is partly markets and partly neither of the five governance modes. In particular, the governance features between the two key actors: cotton producers and textile manufacturers are in a situation of limited cooperation. The actors in the segments act independently. A good number of cotton producers in the value chain have switched the industry, not because the switching cost is low but due to some challenges faced such as market policy issues. A few are still stumbling looking for a policy support in relation to regional land administration and working capital etc. As a result, the industry is not on the direction as anticipated by the GTP plan in terms of volume of production, employment creation, availing of raw cotton input to the textile and hard currency

earnings. The textile manufacturing segment on the other hand gets part of the cotton products input from import squandering the meager hard currency despite the massive potential for cotton that the country possesses. These jointly show a clear disruption on the value chain of the cotton industry. As a result, many whose businesses and lives rely on the value chain are disrupted and harmed. Many claim that the cotton and the textile industries have been long in the industry without common sphere of vision on the ground. No coordination, synergy and dynamism have prevailed along the value chain. This means the degree of influence among the stakeholders is generally loose. All these surely create unnecessary interpretation and power asymmetry on the other part of the value chain which ultimately results in non-streamlined and ineffective value chain incapable of taking initiatives for opportunities and is less competitive in the global business arena.

5.3. Governance System in the SugarCane Value Chain

5.3.1. The Role of Key Actors in the Sugarcane Value Chain

Unlike the cotton industry the sugar industry operates in a less complex manner in terms of the number of operators in the sugarcane production. The sugarcane commodity chain covers a sequence of chain of activities from land and irrigation preparation to sugarcane planation, fertilizer and herbicide application, planting along with the application of fungicides, herbicides, pesticides and fertilizer, weed and insect control. Unlike the cotton industry, the sugar industry actors are well structured each contributing with specified duties and obligation towards the accomplishment of their respective process (see figure 9) above. The principal stakeholder operators are a few legal personal entities (companies and farmer unions). The former is responsible for the overall management of the value chain, whereas the latter involves availing of plots of land and labor force on rental and wage basis respectively. The industry is more technological and capital intensive compared to the cotton production. The major operator or investor in the industry is the Ethiopian Sugar Corporation established as per the Regulation No.192/2010. Like that of the cotton industry stakeholders of the industry can be generically distinguished as principal actors, government support agencies and regulatory frameworks.

i) Input Suppliers

The key inputs to sugarcane production includes: well prepared land, irrigation systems, plantation, agricultural chemicals (including pesticides, herbicides, fungicides, and fertilizers), machinery and utilities used in planting, harvesting and labor force at each level of activities.

Sugarcane suppliers: Usually, there are initial sugarcane and sugarcane seeds. The suppliers are known as 'sugar caners'. The former, used as a parent seed, is supplied usually by foreign partners. The latter is supplied by domestic partners and by own sugar factory farms.

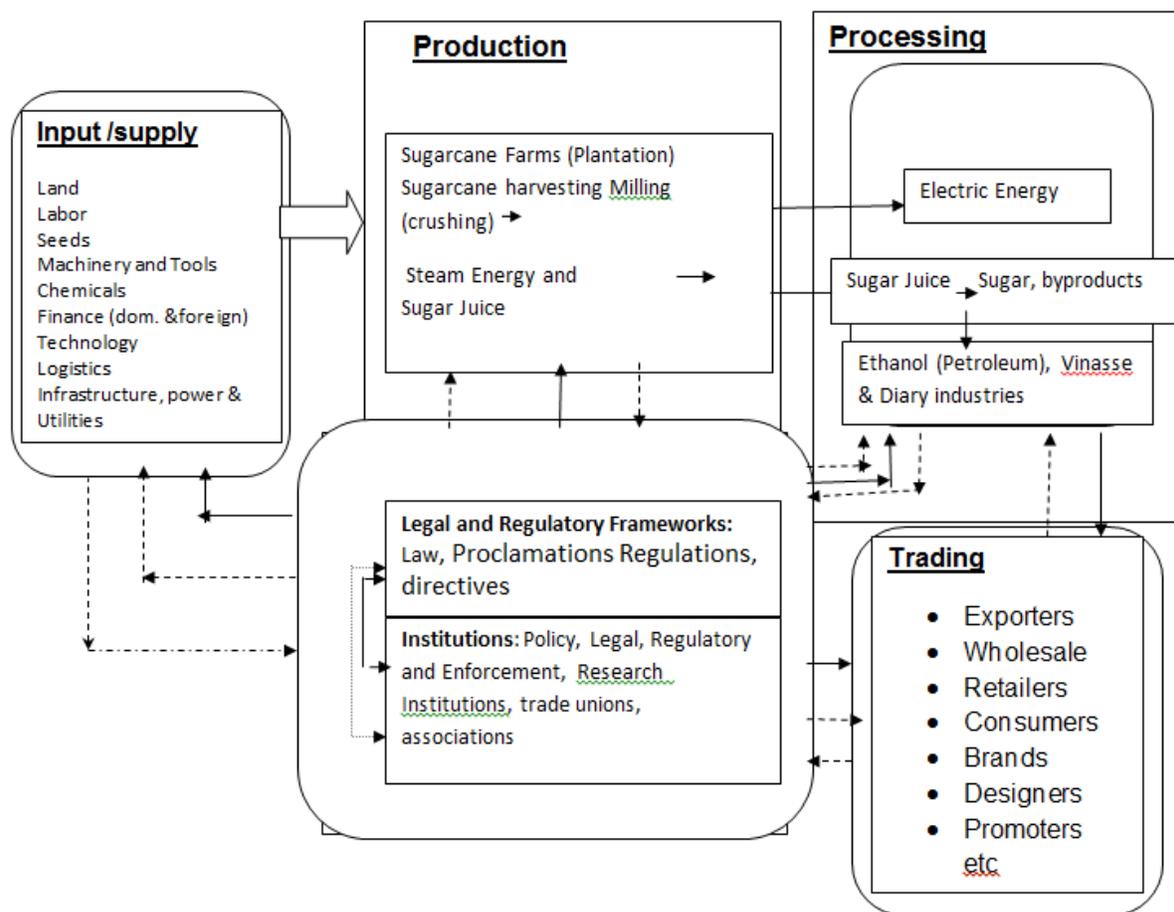


Figure 9: Key Stakeholders of the Sugarcane Value Chain

Agro-chemical Suppliers: These include fertilizers and agro chemicals. There are brand fertilizer and other chemical suppliers in the industry. The key suppliers in the industry are local agents to the brand suppliers.

Agricultural Machinery, equipment and parts: Before the plantation of sugarcane, land has to be developed. The land for plantation is usually developed by a third party by way of contract with equipment owners.

Energy (fuel and lubricant) Supplies: Fuel gas and lubricants are used as input for the land preparations for plantations. Fuel is supplied by petroleum retail companies in Ethiopia sourced from import through Ethiopian Petroleum Enterprise, whereas, lubricants are being supplied directly by the retail petroleum companies. Energy for the factories is however self-sourcing by way of steam. It is learned that sugar factories can supply extra energy from the steam to the national electric grid.

Infrastructure and Water supply: Sugarcane is planted and grown using irrigations. Water is supplied by the Ministry of Water and Energy through building of dams and canals. Further extension of lines may be executed by the sugar farms. Infrastructure like roads,

telecommunication, and health centers are the basic inputs and partners for the successful operation of the industry. Electric power energy from the electric company may be essential at the project phase of the industry. When operation starts sugar factories not only use own electric power but can be good sources for the central electric grid generated from steams produced to crush or mill the sugarcane.

Manpower: Manpower is one of the basic inputs for the industry. The industry is one of the major employment creators in an economy temporarily and on permanent basis. Usually the farm is male-sensitive due to the environment and working situations.

Financing Institutions: Foreign banks (bilateral and multilateral) and domestic banks are the sources of financing.

Project sites and land provision: Regional administrative bodies provide land necessary for the sugarcane plantation and factory and dam sites. Administrations at several levels work for the successful relocation of displaced dwellers along with the necessary utilities and facilities.

ii) Production of Sugar

Production of sugar consists of mainly plantation, sugarcane harvest, transportation, and a processing factory.

Sugarcane plantation: In the Ethiopian sugar industry value chain there are two sources of sugarcane commodity suppliers. Plantation (farms) can be undertaken at own farm and at out-growers. These are sugar factory farms which are subsidiaries of the factories and contracted cooperatives or unions (out-growers). Cooperatives and unions along the administrations at all levels play crucial role for the successful operation of plantation at out-growers' farms. Plantation may be taken on leasing basis with partners. Contracted out-growers receive finance from the sugar firms in-kind credit for land preparation, seed cane, fertilizer, farm expertise, harvesting and transportation which is repaid through installment deduction from the unions' sale price. Currently, the unions neighboring Wonji Sugar Factory are involved in long term contractual agreement to supply sugarcane to the factory on an agreed price. Price of the sugarcane supplied by the members of the union is subject to revision within a length of period specified in the contract entered between the unions and the sugar factory. For the smooth continuity of the supply, the latter has developed and shall continue to extend modern irrigation infrastructure to the farms of the members of the unions on lease basis.

Sugarcane Harvesting: Harvesting of sugarcane includes clearing of leaves with fire, cutting, weighing and trucking to temporary storage at chosen center cites. During harvesting labor is used intensively. Then, final haulage to mill follows.

Crushing Sugarcane: Mainly two products emerge during crushing: Steam energy and Sugar juice or Molasses. Steam energy can be sold to the energy grid and the rest can be used for the factories' own activities including processing the sugar juice further. The output of a mill depends on the volume of the supply of sugarcane and capital goods employed. When molasses is further processed or filtered, Sugar and Bagasse is produced. Further processing of bagasse by the mill produces: ethanol, alcohol, and vinasse (used fertilizer) and filter cake (animal feed). Then the following chain follows:

iii) Sugar market

The Ethiopian Sugar Corporation supplies the local market with sugar produced locally and imported. The outlets for the sugar market include: wholesale and retailers, and microenterprises, and various large and small industries. According to the verbal information from the Ethiopian Sugar Corporation Marketing Department, currently, Ethiopia is importing 200,000mtn to 520,000mtn to avail for the market yearly which is still behind the aggregate demand approximately by more than a million metric ton. The current sugar supply available in the country is distributed for household consumption and to various industries roughly at 3:1 ratio respectively. However, according to the officials, the supply gap shall be fulfilled by the upcoming new sugar factories currently under construction estimated to be operational in the beginning of 2015.

iv) Power and Energy

The Ethiopian Electric power and Petroleum enterprises would be the major stakeholders in the industry where the former gets good quantity of electric power to its national grid and the latter gets high volume of ethanol. As a result, the former increases its supply of power and the latter can minimize the outflow of hard currency in addition to the green energy production and resilience of CC. Besides, the sugar factories can supply ethanol, a by-product from sugar juice to the Petroleum Enterprise; in return Ethiopia can enjoy saving hard currency.

v) Others (Agricultural Bio-fertilizer and dairy Industries)

Sugar industry supplies variety of by-products to various industries including dairy, alcohol and vinasse factories, and fertilizer likely to benefit much from the chain.

vi) Government, Research and Support Agencies

There are a number of industry-wide institutional actors and legal and regulatory factors that contribute politically, governance, advocacy and marketing related activities without which the successfulness of the industry may not be possible. These include:

- Ministry of Agriculture and Rural Development (MoARD): is responsible for developing policies and strategies and supervising the performance and the development of the sector.
- Ministry of Finance and Economic Development (MoFED): for the settlement of foreign loan and interest.
- Ministry of Industry (Mol): develops policies and strategies for the expansion of the sugar industry.
- Sugar Corporation established by Proclamation 192/2010, with the necessary judiciary procedure mainly to process and sell sugar and sugar products.
- Ministry of Trade (MoT): Responsible for the fair distribution of sugar
- Environment Protection Agency (EPA): responsible for protecting the environment
- Regional Administrations: Regional administrative bodies closely work with both the sugar corporation and the Ministry of Water and Energy by way of not only providing the necessary areas but also by way of creating awareness and mobilizing the necessary resources for the relocation of dwellers.

- Cooperatives and Unions: These institutions are significantly important for the close and active engagement of individual household farmers on the sugarcane production process
- Research Institutions: The role of research institutions is in the process of breeding and succession of improved varieties.
- Standard Agency (Regulation No.193/2010): rationalization, selecting and fixing in terms of aspects, sizes, and methods etc.
- Ethiopian National Accreditation Office (Established by regulatory 279/2010): test and accreditation certification for the quality of products
- Ethiopian-Conformity Assessment Enterprise (Established by Regulation No. 196(2010): provides certificate with respect to the country's export products, by assessing their conformity to the relevant national and international standards or standards of other countries
- Health and safety institutions:
- Micro and Small Enterprises: provide labor force to the sugarcane production in line with the demand of Sugar farms demand

vii) Policies, Legal and Regulatory Frameworks

Policies, Legal and regulatory frameworks shape the role of the actors in the value chain. A broad range of policies can facilitate or hinder the productivity of a given value chain. In Ethiopia a number of policies and legal and regulatory issues were issued. Among others, the legal and regulatory frameworks relevant to the value chain of the two commodities include: GTP, Climate Resilience policies and Strategies, Cooperative proclamations, Investment proclamations, Directive in relation to sugar distributions, the Ethiopian labor law etc.

5.3.2. Mode of Governance System in the Sugarcane Value Chain

The Sugar Corporation is established as per the "Council of Ministers Regulation No. 192/2010" as a public enterprise. The Corporation is governed by the Public Enterprises Proclamation No.25/1992. Private sugar factories are established as per the commercial code cited as the "Commercial Code Proclamation, 1960" where shareholders enter into the ownership and accountabilities as per the respective Articles of Association and Memorandum of Associations. The two documents of association define the number of shares authorized, the amount of capital paid, the board of directors, accountability and responsibilities of the leaders, board of directors and the general assembly among others.

The governance system in the value chain of the sugar industry in general is based on the hierarchically characterized by vertical integration. Each area management at the industry reports to the supervising division or department. In turn, each department reports to the executive officer(s). The executive officers in turn report to the board of directors or shareholders of the respective companies. The Sugar Corporation works closely with farm holding unions and cooperatives. As explained earlier, the former provides irrigation infrastructures, expertise and sugarcane seeds. The latter supplies sugarcane products and labor on an agreed price. Regarding marketing, the Sugar Corporation distributes to wholesale companies, to cooperatives and industries based on some specified terms and conditions stipulated on the contract of sales. The wholesale companies distribute to retailing shops and

households. The wholesale and cooperatives are required to file reports back to the corporation about the distribution as conditions for the next delivery. The corporation also supplies steam energy to the national grid and by-products to the various companies. Generally, the sugar industry in Ethiopia interacts formally (contractual) with most of the key actors along the value chain. Therefore, the form of governance system of the value chain in general is a combination of both hierarchical and relational type. This enables the industry to have a power of influence within the value chain of the industry. Power of influence in the value chain gives the industry the capability to use opportunities and competitiveness in the global competition in the industry. Integrating vertically within the value not only provides the opportunity to add more value on the product but also fosters capability to enable closer relationship between both buyers and suppliers (Stamm, 2004). However, literature underpin strongly that vertical integration creates opportunity to control resources and market at the cost of innovations, creativity and efficiency.

6. Conclusions and implications

Climate change poses threat to all economic actors. The degree of impact may vary from actor to actor or from activity to activity, depending on various vulnerability factors. One aspect to understand the degree of impact and to suggest potential adaptation options is to examine the role of participating economic agents, their economic linkages and governance within the value chain. The various economic players are vertically and horizontally integrated in the chains engaged in activities such as input supply, production, distribution or consumption of a certain agricultural value chain. Since the environment provides a base for economic activities and the basis for most essential inputs including energy and the capacity to dispose emissions and waste (FaBe et al. 2009), it is quite useful to integrate the environment into the discussion through the value chain approach. Especially agricultural productions are largely based on natural resources. Other reasons for incorporating the environment perspective into a value chain analysis are that the environment impact of products has become a major aspect of policy programs. Climate change brings warmer temperatures, increased frequency and severity of extreme weather events that can affect availability of natural resources (Boons, 2002). As a result, climate change poses risk on agricultural commodities and their respective value chains. Climate change risks posed on agricultural commodity may be described from different contents of a value chain.

- Farm management risks: that includes use of inputs, interaction of technology, management practices affects the output and the income thereof is the major risk along the value chain (World Bank 2005)
- Ecological risks related to crop yields, climate change, management of natural resources including water (irrigation, rainfall etc)
- Market risks associated with the value chain of input and output price quality, safety, new products and technological changes OECD (2009).
- Institutional risk: Changes in the legal frameworks that may include agricultural policies, regulations, Food safety and environmental regulations, and tax provisions may have significant impact on the productivity and profitability of household farms (Hurine et al. 2000);
- Shocks, such as, illness or death and medical services along the value chain affect the performance of the households in the agricultural sector (Wolday et al.2013.)

The risk includes disruption of production, core business operations and ultimately breaking down of parts of the value chain. Literatures underline value chains that are less streamlined and integrated experience weak governance structure. Value chains with poor governance structure in turn lack proper information flow, understanding and demonstrating of mitigating mechanisms, integrating established best match business practices in addressing risks.

Given this background, a careful examination of the Ethiopian cotton industry shows that it is relatively more exposed to the risks of climate change due to the poor governance system that cotton value chain currently experiences among other things. Evidences show that lack of proper information flow, understanding and demonstrating of mitigating mechanisms, integrating established best match business practices in addressing risks currently characterize the cotton value chain and hence renders a fragmented response as a result to the risks posed due to climate changes. Besides, the value chain operates in a business environment of various stakeholders with different governing regulatory bodies. Adaptation can also be constrained due to the complexities of governance networks that often comprise multiple actors and institutions such as government agencies, market actors, non-government organizations, as well as informal community organizations and social networks (Rosenau, 2005, Carlsson-Kanyama et al., 2013; Sosa-Rodriguez, 2013). These actors may have different objectives, jurisdictional authority as well as levels of power or resources. Hence, coordination among these different actors is essential for facilitating adaptation decision making and implementation (Young, 2006 and Grothmann, 2011). The possibility for sustaining the value chain and the actors within the value chain is only possible if value chain competitiveness is maintained. And this is feasible with a value chain that operates in a strong value chain governance system with clear roles and smooth information flow.

On the other hand, the sugarcane commodity value chain operates in relatively well streamlined and vertically integrated value chain governance compared to that of the cotton value chain. Besides, the industry operates in a well regulated and well-structured business environment, its scope and objectives are well defined. There is a strong link with the surrounding community established by way of long term contracts. The link between the wholesale market and by-product business bases more or less on clear and transparent information. All these supports the industry to easily adapt to the climate change risks. A key role that institutions play in facilitating adaptation is through legal and regulatory frameworks. Government policies and regulatory practices may influence governance matters and adaptation practices along a value chain (Pini et al., 2007, Mesham et al., 2011; Matthews, 2013).

In terms of actors and activities, we find that farming activities are more vulnerable to climate change due to their lowest contribution of value additions to the total value addition. This means that as economic actors (or economies in general) move away from primary activities such as farming toward processing and manufacturing, the percentage of value addition significantly increases; and this helps them to be less vulnerable to climate change impacts. The complexity of an agricultural value chain also has an impact on the degree of resilience and/or vulnerability; for example, the more lengthy and complex a value chain is the more unclear the roles are and the more technical and financial support it requires for the value chain to fully function and become competitive.

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